



BUDDHA INSTITUTE OF TECHNOLOGY, GIDA, GORAKHPUR
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
PRE-AKTU EXAM (EVEN SEMESTER 2022-23)
JULY-2023

Course: B.Tech Semester: 4
Subject: Signal System Subject Code: KEC - 403
M.M. 100 Time: 3:00 hrs Roll No. _____

SECTION-A

1. Attempt all questions. Each questions carry equal marks.

Marks: 10*2=20

Q. No.	Question	Level of Taxonomy	Course Outcome
a.	State Nyquist Criteria.	L2	C01
b.	Determine the fundamental period of the following, if the signal is periodic $x(t) = \cos(\pi t) + \cos(2\pi t)$.	L2	C01
c.	Find the z transform of $u(n)$.	L2	C02
d.	Find the z transform of $u(n)$.	L2	C02
e.	What is Aliasing? What is an antialiasing filter.	L2	C03
f.	Write down Dirichlet conditions for the existence of Fourier Transform.	L2	C03
g.	Draw the signal $u(n) - u(n-3)$.	L2	C04
h.	State convolution property of the Laplace Transform.	L2	C04
i.	State the expression of Convolution Integral.	L2	C05
j.	Explain time invariant and Causal System.	L2	C05

SECTION-B

2. Attempt ALL questions. Each questions carry equal marks.

Marks: 3*10= 30

Q. No.	Question	Level of Taxonomy	Course Outcome
a.	Consider $x(t) = \cos(2\pi f_0 t)$. Determine it is a power signal or energy signal.	L2	C01
or			
a.	Determine the even and odd components of the following signals (i) $x(t) = \cos(t) + \sin(t) + \cos(t) \cdot \sin(t)$ (ii) $x(n) = \{1, 1, 1, 1, 1\}$	L2	C01
b.	Find the Fourier transform of the signal given below: $x(t) = e^{-at} u(t)$ and sketch the magnitude and phase spectrum.	L2	C02
or			
b.	Find Inverse Laplace transform of (i) $X(s) = \frac{s+3}{s^2+3s+2}$ (ii) $X(s) = \frac{2s-1}{s^2+2s+1}$	L2	C02
c.	(i) Find Fourier transform of the signal $x(t) = e^{-a t }$	L2	C03

SECTION-C

3. Attempt ANY ONE questions. Each questions carry equal marks.

Marks: 1*10=10

Q. No.	Question	Level of Taxonomy	Course Outcome
a.	Find Laplace transform of the following given signals and define their RoCs (i) $x(t) = e^{-t}u(t) + e^{2t}u(-t)$ (ii) $x(t) = (2e^{2t} + 3e^{3t})u(-t)$	L2	C01
b.	Find Impulse response of the system described by the equation. $2y'(t) + 3y(t) = x(t)$	L2	C01

4. Attempt ANY ONE questions. Each questions carry equal marks.

Marks: 1*10=10

Q. No.	Question	Level of Taxonomy	Course Outcome
a.	Find Z-transform of the given signal. $X(n) = \left(\frac{1}{2}\right)^n u(n) + \left(\frac{1}{3}\right)^n u(n)$ (ii) $x(n) = a^n u(n)$	L2	C02
b.	Implement the Convolution integral on the signals $x(t) = e^{-2t}u(t)$ and $h(t) = u(t)$.	L2	C02

5. Attempt ANY ONE questions. Each questions carry equal marks.

Marks: 1*10=10

Q. No.	Question	Level of Taxonomy	Course Outcome
a.	Implement the Convolution sum on the signals $x(n) = a^n u(n)$ and $h(n) = u(n)$.	L2	C03
b.	Using Fourier transform, find the convolution of $x_1(t) = \mathcal{F}^{-2t} \mathcal{F}(\mathcal{F})$, $x_2(t) = \mathcal{F}^{-3t} \mathcal{F}(\mathcal{F})$	L2	C03

6. Attempt ANY ONE questions. Each questions carry equal marks.

Marks: 1*10=10

Q. No.	Question	Level of Taxonomy	Course Outcome
a.	Find the continuous time Fourier transform of the Gate/Rectangular signal. Also plot its magnitude response.	L2	C04
b.	Determine the total response of the differential equation $\frac{d^2y(t)}{dt^2} + 3\frac{dy(t)}{dt} + 2y(t) = x(t)$ Where $y(0)=3$, $y'(0)=4$, $x(t)=4e^{-2t}$ and $t \geq 0$.	L2	C04

7. Attempt ANY ONE questions. Each questions carry equal marks.

Marks: 1*10=10

Q. No.	Question	Level of Taxonomy	Course Outcome
a.	Find Z-Transform of the signal $x(t) = \cos(\omega)u(n)$	L2	C05
b.	State and prove the Sampling theorem and discuss the effect of undersampling.	L2	C05

Note: Revised Bloom's Taxonomy Levels-

L1-> Remembering, L2-> Understanding, L3-> Applying, L4-> Analyzing, L5-> Evaluating, L6-> Creating

